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10/587,940	09/29/2006	Ya Xu	2006-1228A	6659

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WENDEROTH, LIND & PONACK, L.L.P.
1030 15th Street, N.W.,
Suite 400 East
Washington, DC 20005-1503

EXAMINER
VAN OUDENAREN, SARAH A

ART UNIT	PAPER NUMBER
1793	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/587,940	XU ET AL.	
	Examiner	Art Unit	
	SARAH VAN OUDENAREN	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 August 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2,3,5,6,9,12,13,15,16,18-21,23,24,26 and 27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2,3,5,6,9,12,13,15,16,18-21,23,24,26, and 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 August 2006* is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-3 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Shaw et al (US 5,330,701).

Shaw teaches an intermetallic powder which is Ni_3Al (col 2, lines 30-35 and col 4 lines 30-40).

Alternatively, "[e]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.", (In re Thorpe, 227 USPQ 964,966). Once the Examiner provides a rationale

tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious different between the claimed product and the prior art product (*In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983), MPEP 2113).

Regarding claim 2, Shaw teaches 86.7 wt% Ni and 13.3 wt% Al (col 7, lines 45-50). Further, Shaw teaches that for Ni_3Al the Ni may be present in an amount of 84.0-88.0 wt% (col 9, lines 45-50). The balance would inherently be 12.0-16.0 wt% Al.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw et al (US 5,330,701) as applied to claims 2-3 above and further in view of Lashmore et al (US PG Pub 2008/0014431) as evidenced by Coll et al (US PG Pub 2003/0042226).

Shaw teaches an intermetallic Ni_3Al compound as discussed above.

Shaw does not teach carbon nanofibers containing fine metal particles deposited on the surface of the compound.

Lashmore discusses a catalyst particle may be embedded in a nanotube fiber (page 1, paragraph 4, lines 8-13). Lashmore also teaches a substrate having catalyst particles deposited on the substrate (page 1, paragraph 8, lines 4-8) and that these catalyst particles can be nickel and its compounds.

Coll teaches a method to grow carbon nanotubes on a micro pattern and specifically on the surface of a NiAl nano-supported catalyst (pg 4, paragraph 30).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include the Ni_3Al intermetallic compound of Shaw with the carbon nanofibers of Lashmore as Coll teaches it is known to grow carbon nanotubes on a NiAl catalyst and further because the carbon nanofibers of Lashmore are synthesized on the surface of the catalytic particles which are taught as Ni or alloys of Ni and that the nanofibers may also contain catalytic particles.

Regarding claim 13, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the Ni_3Al intermetallic compound of Shaw with the carbon nanofibers of Lashmore because the carbon nanofibers of Lashmore are synthesized on the surface of the catalytic particles which are taught as Ni or alloys of Ni and that the nanofibers may also contain catalytic particles.

Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw et al (US 5,330,701) as applied to claims 2-3 above and further in view of Makoto et al (JP 63-209753) as evidenced by Lessing (US 5,496,655).

Shaw teaches an intermetallic Ni_3Al compound as discussed above.

Shaw does not teach the compound being acid or alkali treated.

Makoto teaches a catalyst for methanol reforming where Cu, Ni, and Al are to be used. The compound is alkali treated to obtain precipitates (see abstract).

Lessing teaches a Ni_3Al intermetallic materials being catalytic in character and used in steam reforming of hydrocarbon fuels, i.e. methane, into hydrogen (col 5, lines 47-55).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the alkali treatment of Makoto with the compound of Shaw in order to obtain precipitates, and further, as Lessing teaches the Ni_3Al intermetallic material being used as a catalyst for methane reformation, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a similar material for a similar purpose.

Regarding claim 16, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the alkali treatment of Makoto with the compound of Shaw in order to obtain precipitates, and further, as Lessing teaches the Ni_3Al intermetallic material being used as a catalyst for methane reformation, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a similar material for a similar purpose.

Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw et al (US 5,330,701) as applied to claims 2-3 above and further in view of Takuya et al (JP 02-141402) as evidenced by Lessing (US 5.496,655).

Shaw teaches an intermetallic Ni_3Al compound as discussed above.

Shaw does not teach producing hydrogen.

Takuya teaches a Ni containing metal being deposited on a member into which Al is incorporated to form a catalyst on the surface. Methanol or a mixture of methanol and water is supplied to the catalytic surface and a hydrogen containing gas is produced form the mixture. Takuya teaches this method increases the reforming reaction rate for methanol (see abstract).

Lessing teaches a Ni_3Al intermetallic materials being catalytic in character and used in steam reforming of hydrocarbon fuels, i.e. methane, into hydrogen (col 5, lines 47-55).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the method of producing hydrogen of Takuya with the compound of Shaw in order to increase the reforming reaction rate for methanol and further, as Lessing teaches the Ni_3Al intermetallic material being used as a catalyst for methane reformation, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a similar material for a similar purpose.

Regarding claim 21, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the method of producing hydrogen of Takuya with the compound of Shaw in order to increase the reforming reaction rate for methanol and further, as Lessing teaches the Ni_3Al intermetallic material being used as a catalyst for methane reformation, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a similar material for a similar purpose.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw et al (US 5,330,701) as modified by Takuya et al (JP 02-141402) as evidenced by Lessing (US 5.496,655) as applied to claims 2, 3, and 21 above and further in view of Fukui et al (US 5,635,439).

Shaw teaches an intermetallic Ni_3Al compound as discussed above.

Shaw does not teach producing hydrogen.

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the method of producing hydrogen of Takuya with the compound of Shaw in order to increase the reforming reaction rate for methanol and further, as Lessing teaches the Ni_3Al intermetallic material being used as a catalyst for methane reformation, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a similar material for a similar purpose.

Neither Shaw nor Takuya teach reducing the catalyst in a hydrogen atmosphere.

Fukui teaches a catalyst for methanol reformation which is heated in an air stream containing hydrogen to reduce the catalyst in order to impart catalytic activity to the catalyst (col 1, lines 45-55).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the reduction of Fukui with the compound of Shaw as modified by Takuya in order to impart catalytic activity upon the compound.

Claims 5-6 and 12-13 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw et al (US 5,330,701) in view of Lashmore et al (US PG Pub 2008/0014431) as evidenced by Coll et al (US PG Pub 2003/0042226).

Shaw teaches an intermetallic Ni_3Al compound as discussed above.

Shaw does not teach carbon nanofibers containing fine metal particles deposited on the surface of the compound.

Lashmore discusses a catalyst particle may be embedded in a nanotube fiber (page 1, paragraph 4, lines 8-13). Lashmore also teaches a substrate having catalyst particles deposited on the substrate (page 1, paragraph 8, lines 4-8) and that these catalyst particles can be nickel and its alloys.

It would have been obvious to one of ordinary skill in the art at the time of the invention to include the Ni_3Al intermetallic compound of Shaw with the carbon nanofibers of Lashmore as Coll teaches it is known to grow carbon nanotubes on a NiAl catalyst and further because the carbon nanofibers of Lashmore are synthesized on the surface of the catalytic particles which are taught as Ni or alloys of Ni and that the nanofibers may also contain catalytic particles.

Regarding claim 6, Lashmore teaches that the carbon nanotube fibers may contain catalyst particles (page 1, paragraph 4, lines 8-13) and that the catalyst particles are Ni or its alloys. It would have been obvious to one of ordinary skill in the art at the time of the invention to include the particles of Lashmore with the Ni_3Al intermetallic compound of Shaw in order to aid in increased catalytic performance.

Regarding claim 26, Shaw teaches 86.7 wt% Ni and 13.3 wt% Al (col 7, lines 45-50). Further, Shaw teaches that for Ni_3Al the Ni may be present in an amount of 84.0-88.0 wt% (col 9, lines 45-50). The balance would inherently be 12.0-16.0 wt% Al.

Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw et al (US 5,330,701) as modified by Lashmore et al (US PG Pub 2008/0014431) as evidenced by Coll et al (US PG Pub 2003/0042226) as applied to claims 5-6 above and further in view of Makoto et al (JP 63-209753).

Shaw teaches an intermetallic Ni_3Al compound as discussed above.

Shaw does not teach carbon nanofibers containing fine metal particles deposited on the surface of the compound.

It would have been obvious to one of ordinary skill in the art at the time of the invention to include the Ni_3Al intermetallic compound of Shaw with the carbon nanofibers of Lashmore as Coll teaches it is known to grow carbon nanotubes on a NiAl catalyst and further because the carbon nanofibers of Lashmore are synthesized on the surface of the catalytic particles which are taught as Ni or alloys of Ni and that the nanofibers may also contain catalytic particles as discussed above.

Neither Shaw nor Lashmore teaches the compound being acid or alkali treated.

Makoto teaches a catalyst for methanol reforming where Cu, Ni, and Al are to be used. The compound is alkali treated to obtain precipitates (see abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the alkali treatment of Makoto with the compound of Shaw as modified by Lashmore in order to obtain precipitates.

Regarding claim 19, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the alkali treatment of Makoto with the compound of Shaw as modified by Lashmore in order to obtain precipitates.

Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw et al (US 5,330,701) as modified by Lashmore et al (US PG Pub 2008/0014431) as evidenced by Coll et al (US PG Pub 2003/0042226) as applied to claims 5-6 above and further in view of Takuya et al (JP 02-141402).

Shaw teaches an intermetallic Ni_3Al compound as discussed above.

Shaw does not teach carbon nanofibers containing fine metal particles deposited on the surface of the compound.

It would have been obvious to one of ordinary skill in the art at the time of the invention to include the Ni_3Al intermetallic compound of Shaw with the carbon nanofibers of Lashmore as Coll teaches it is known to grow carbon nanotubes on a NiAl catalyst and further because the carbon nanofibers of Lashmore are synthesized on the surface of the catalytic particles which are taught as Ni or alloys of Ni and that the nanofibers may also contain catalytic particles as discussed above.

Neither Shaw nor Lashmore teaches the production of hydrogen.

Takuya teaches a Ni containing metal being deposited on a member into which Al is incorporated to form a catalyst on the surface. Methanol or a mixture of methanol and water is supplied to the catalytic surface and a hydrogen containing gas is produced form the mixture. Takuya teaches this method increases the reforming reaction rate for methanol (see abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the method of producing hydrogen of Takuya with the compound of Shaw as modified by Lashmore in order to increase the reforming reaction rate for methanol.

Regarding claim 24, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the method of producing hydrogen of Takuya with the compound of Shaw as modified by Lashmore in order to increase the reforming reaction rate for methanol.

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw et al (US 5,330,701) as modified by Lashmore et al (US PG Pub 2008/0014431) as evidenced by Coll et al (US PG Pub 2003/0042226) as applied to claims 5 and 23 above and further in view of Fukui et al (US 5,635,439).

Shaw teaches an intermetallic Ni_3Al compound as discussed above.

Shaw does not teach carbon nanofibers containing fine metal particles deposited on the surface of the compound.

It would have been obvious to one of ordinary skill in the art at the time of the invention to include the Ni_3Al intermetallic compound of Shaw with the carbon nanofibers of Lashmore as Coll teaches it is known to grow carbon nanotubes on a NiAl catalyst and further because the carbon nanofibers of Lashmore are synthesized on the surface of the catalytic particles which are taught as Ni or alloys of Ni and that the nanofibers may also contain catalytic particles as discussed above.

Neither Shaw nor Lashmore teaches reducing the catalyst in a hydrogen atmosphere.

Fukui teaches a catalyst for methanol reformation which is heated in an air stream containing hydrogen to reduce the catalyst in order to impart catalytic activity to the catalyst (col 1, lines 45-55).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the reduction of Fukui with the compound of Shaw as modified by Lashmore in order to impart catalytic activity upon the compound.

Response to Arguments

Applicant's arguments filed 8/3/2009 have been fully considered but they are not persuasive.

Applicant argues that examiner has not shown similarity in the product of Shaw in reference to the instant application and therefore burden has not shifted to applicant to show an unobvious difference between the instant product and the Shaw product. However, examiner has shown as discussed above that Shaw teaches an intermetallic

powder which is Ni_3Al (col 2, lines 30-35 and col 4 lines 30-40). Further, as Shaw teaches a heat resistant material, which would clearly be able to function as a catalyst, the burden has shifted to applicant in order to show that the instant method would result in a different powder. As claim 2 is dependent upon claim 3, and Shaw teaches overlapping ranges, the rejection is maintained. Regarding claims 12-13 which are rejected above over Shaw in view of Lashmore as evidenced by Coll, applicant argues that this rejection is improper due to the deficiencies of Shaw. It is noted that Coll does not teach a method of growing carbon nanotubes on the surface of Ni_3Al, but is only relied upon by examiner for its teaching that it is known to grow carbon nanotubes on a NiAl catalyst and it is unclear to examiner how this would constitute a major difference as this is utilized to modify Shaw which does in fact teach a Ni_3Al. Again it is noted, as Shaw teaches a heat resistant material, which would clearly be able to function as a catalyst, the burden has shifted to applicant in order to show that the instant method would result in a different powder.

Regarding the rejection over Shaw in view of Makoto as evidence by Lessing, applicant argues that the alkali treatment is different that that of the instant invention. It is noted that the claim language does not in fact require any method limitations, only that an alkali treatment if performed. Further, Lessing does not explicitly teach a methanol reforming catalyst, however, as discussed above, Lessing teaches Ni_3Al intermetallic materials being catalytic in character and used in steam reforming of hydrocarbon fuels, i.e. methane (col 5, lines 47-55). Thus, as taught by Lessing, examiner maintains that as Ni_3Al intermetallic materials are known to be catalytic in

nature and have use known in hydrocarbon reformation, it would be expected that the material would be able to perform as a methanol-reforming catalyst as discussed above. Examiner therefore maintains the rejection.

Regarding claims 20-21, applicant argues the rejection over said claims is improper as the art does not teach fine metal particles. However, this limitation is not required by instant claims 20-21 and therefore the rejection is maintained.

Regarding applicants arguments drawn to claim 9 are substantially similar to those of claim 3 and 21 from which 9 depends, such arguments have been discussed above and the rejection is maintained.

The rejection over claims 5-6 and 12-13 in view of Lessing as discussed in the previous action has been overcome in that Lessing does not teach fine metal particles. However, claims 5-6 have been rejected over Shaw in view of Lashmore as evidenced by Coll is maintained for substantially the same arguments as discussed above regarding Shaw. As claims 12-13 are dependent upon claims 5-6, they are rejected over Shaw in view of Lashmore as evidenced by Coll as set forth above.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SARAH VAN OUDENAREN whose telephone number is (571)270-5838. The examiner can normally be reached on Monday-Thursday, 9:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Melvin Curtis Mayes can be reached on 571-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SARAH VAN OUDENAREN/
Examiner, Art Unit 1793
October 29, 2009

/Melvin Curtis Mayes/
Supervisory Patent Examiner, Art Unit 1793